CHAPTER XIX.

FORESTRY.

§ 1. Forestry.

1. **General.**—Economic forestry aims at the preservation and development of existing forest areas by safeguarding against fire and other destructive agencies, by expert supervision of the removal of timber, by judicious thinning, and by reforestation of denuded areas with suitable new growths of local or exotic origin. It provides also for the continuance of an indispensable form of national wealth by the afforestation of available bare lands adapted to the growth of various timbers. Though large areas of virgin forests still remain in Australia, the inroads made by timber-getters, by agriculturists, and by pastoralists—who have destroyed large areas by "ring-barking"—are considerable, and it is not unlikely that climatological changes are caused thereby. It is stated that beneficial consequences follow on the planting of trees on denuded lands, or along eroding coasts, and that a forest-covering beneficially regulates the effects of rainfall.

Successful planting of exotics in various parts of Australia has demonstrated that the climate is suitable for the cultivation of a large number of the most valuable and beautiful of the world's timber trees.

2. **Extent of Forests.**—(i) *Australia.* Scientific surveys of the forests of the various States have not yet been completed, and there are, in consequence, conflicting reports regarding the total forest area of Australia. Expert foresters, however, estimate the forest area possible for permanent reservation at approximately 24,500,000 acres, distributed throughout the States as follows :—

ESTIMATED FOREST AREA—AUSTRALIA, 1924–25.

State.	Total Forest Area.	Percentage on Total Area.
	Acres.	%
New South Wales	8,000,000	4.04
Victoria	5,500,000	9.78
Queensland	6,000,000	1.40
South Australia	500,000	0.21
Western Australia	3,000,000	0.48
Tasmania	1,500,000	8.94
Total	24,500,000	1.29

(ii) *Comparison with other Countries.* The absolute and relative forest areas of Australia and other countries are shown below :—

FOREST LANDS.—RELATIVE AREAS, VARIOUS COUNTRIES.

Country.	Total Wooded Area.	Percentage on Total Area.	Country.	Total Wooded Area.	Percentage on Total Area.
	Sq. Miles.	%		Sq. Miles.	%
Soviet Republics ..	2,662,000	37.81	Norway ..	27,434	21.95
Canada	965,234	26.78	Rumania ..	26,436	21.62
United States ..	724,150	24.35	Italy	21,309	17.81
India (British) ..	228,850	20.91	Spain	18,965	9.74
Sweden	90,889	57.35	Czecho-Slovakia ..	17,996	33.17
Japan	74,019	50.13	New Zealand ..	17,969	17.30
Finland	71,770	55.80	Austria	12,220	37.75
Germany	50,608	26.29	Latvia	7,027	27.70
France	39,873	18.74	Greece	5,844	11.71
Australia	**38,281**	**1.29**	United Kingdom	5,180	3.90
Poland	32,781	21.99			

3. **Distribution.**—The characteristics of the forest areas are given in some detail for each State in Official Year Book No. 6, pp. 446–9. The more conspicuous timber regions of Australia as a whole are the eastern and southern portions, including Tasmania, and the south-western portion northwards and eastwards from Cape Leeuwin. In regard to distribution, on the eastern side of the continent the largest timber is found on the crests and coastal slopes of the mountain ranges, but in the south-west, in addition to the vegetation between mountains and sea, a large area of forest stretches inland from the coastal ranges. The hills encircling Adelaide and Yorke and Eyre Peninsulas also bear good forest. The Kimberley district is timbered, and in the Northern Territory and round the shores of the Gulf of Carpentaria there are considerable forest areas. In the coastal regions of parts of West and North-West Australia, and along the shores of the Great Australian Bight and Encounter Bay, there is little forest. The areas in the centre of the continent are thinly timbered.

Special articles relating to Australian Eucalpytus timbers and the chemical products of Eucalypts will be found in Official Year Book No. 10, pp. 85–98.

§ 2. Forestry Departments.

1. **Functions.**—Each State has organized a separate Department or Commission specially charged with the control and management of the State forests and timber reserves. Extensive survey work is carried on with a view to the classification of forest lands and the proclamation of State forests. The forests are improved by systematic cutting and scientific treatment, by judicious thinning and ringbarking, by the making of roads and the establishment of fire-breaks, and by the removal and destruction of debris, and stunted, diseased or suppressed growth. Provision is made for effective patrols in forest districts to check the ravages caused by fire, often due, it is believed, to carelessness. The training of forest officers, the conduct of research work, and the collection of forestry statistics are also undertaken.

2. **Forest Reservations.**—At the Interstate Conference on Forestry, held at Hobart in 1920, the forestry authorities of the various States agreed upon the necessity of reserving an area of 24,500,000 acres of indigenous forest lands to meet the future requirements of Australia. This area was distributed among the States as set out in § 1. 2 *ante*.

Having been endorsed by the Premiers' Conference held later in the same year, this area was adopted as the Australian forest ration towards which the authorities are now aiming for permanent reservation. The progress made in the various States to the end of June, 1925, is set out in the following table :—

AREA OF FOREST RESERVATIONS, 30th JUNE, 1925.

Particulars.	N.S.W.	Vic.	Q'land.	S. Aust.	W. Aust.	Tas.	Total.
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Dedicated State forests ..	5,145,957	3,581,388	1,775,309	205,183	134,296	142,327	10,984,460
Timber and fuel reserves ..	1,637,458	749,081	3,246,746	5,578	881,272	1,641,725	8,161,860
Total ..	6,783,415	4,330,469	5,022,055	210,761	1,015,568	1,784,052	19,146,320

The area of State forests reserved in perpetuity amounted in June, 1925, to 10,984,460 acres, or 44.8 per cent. of the quota adopted for Australia, while the timber reserves, which are liable to cancellation, embraced an area of 8,161,860 acres, making a total area of 19,146,320 acres under the control of the Forestry Departments. Of this area a considerable proportion consists of inaccessible mountainous country and cut-over lands, while the Australian quota recommended refers to merchantable forest only. The foresters of Australia are, therefore, faced with a difficult task in improving and preserving the existing forests, and in securing the reservation of further suitable forest country to ensure a permanent supply of accessible timber.

3. **Sylvicultural Nurseries and Plantations.**—Recognition of the necessity for systematic sylviculture has led to the creation in all of the States of a number of sylvicultural nurseries and plantations. The locality of these establishments, together with a brief statement of the nature of their activities, is given in previous issues of the Year Book. (Reference may be made to Official Year Book No. 6, pp. 451–3.) Details regarding forest plantations and employment are given hereunder :—

SYLVICULTURAL PLANTATIONS AND FORESTRY EMPLOYMENT, 1924–25.

Particulars.	New South Wales.	Victoria.	Q'land.	South Australia.	Western Australia.	Tasmania.	Total.
Total area of Effective Plantations—							
Softwoods .. Acres	9,461	8,550	538	13,774	1,070	250	33,643
Hardwoods .. Acres	..	2,160	940	5,781	..	..	8,881
Number of persons employed in Forestry Departments—							
Office Staff .. No.	32	39	58	9	40	3	181
Field Staff .. No.	410	127	204	155	213	7	1,116

4. **Revenue and Expenditure.**—The revenue and expenditure of the State Forestry Departments from 1920–21 to 1924–25 are given below :—

FORESTRY DEPARTMENTS.—REVENUE AND EXPENDITURE, 1920–21 TO 1924–25.

State.	1920–21.	1921–22.	1922–23.	1923–24.	1924–25.
	REVENUE.				
	£	£	£	£	£
New South Wales	190,742	217,841	168,698	186,393	209,732
Victoria	95,517	155,160	163,076	166,556	162,792
Queensland	145,802	220,950	267,816	227,830	246,641
South Australia	23,872	11,234	8,362	11,110	22,905
Western Australia	58,617	88,529	87,658	127,253	182,764
Tasmania	20,444	18,891	19,346	21.150	20,757
Total	534,994	712,605	714,956	740,292	845,591
	EXPENDITURE.				
	£	£	£	£	£
New South Wales	179,540	186,588	137,108	137,705	153,722
Victoria	71,386	130,076	138,714	160,373	199,575
Queensland	72,718	201,865	158,618	66,670	60,542
South Australia	33,924	36,467	40,822	40,487	43,459
Western Australia	27,632	47,885	38,827	48,333	86,739
Tasmania	2,621	7,069	8,293	8,277	11,435
Total	387,821	609,950	522,382	461,845	555,472

5. **Instruction in Scientific Forestry.**—Forestry schools have been established in New South Wales, Victoria, and Western Australia, in which general scientific instruction is imparted, special attention being paid to forestry. In the classes, theoretical forestry, botany, geology, physics, land surveying, etc., are taught; while in outside work trainees receive practical instruction in the preparation of seed-beds, seed-sowing, propagation, planting out, pruning, the general care and improvement of plantations and natural forests, and the employment of timber to the best advantage. Courses of lectures are also given at various centres, and, at some of the higher technical schools, members of the forest staffs are afforded opportunities of qualifying in special subjects. It was early realized, however, that a higher national school was necessary for the equipment of foresters fully qualified to undertake every branch of forestry work, and this matter has engaged the attention of the forestry authorities in the various States since 1916. A site for the school was chosen, the curriculum was drawn up, and complete unanimity was arrived at regarding the higher training to be given at the institution, but matters were allowed to remain in abeyance. Early in 1925, however, the Commonwealth Government assumed the responsibility of establishing the institution, and the States agreed to nominate a certain number of students annually. Applicants for entry must have completed a two years' science course at one of the universities. The school, comprising fourteen students, is housed for the first year at Adelaide University, but in March, 1927, it will be transferred to Canberra, the Federal Capital City.

6. **Forest Congresses.**—Interstate Conferences on Forestry were held in 1911 and 1912, chiefly with a view of securing uniformity of management. An International Forest Congress was held at Paris in June, 1913, when a Professor of South Kensington Imperial College represented the Commonwealth Government. The papers and reports dealt chiefly with the threatened shortage of timber, and the measures necessary to avert the danger. An Imperial Forestry Conference was held in London in the summer of 1920, at which also Australia was represented. Important Interstate Forestry Conferences were held in Adelaide in May, 1916; at Perth in November, 1917; at Hobart in April, 1920; at Brisbane in April, 1922, and at Sydney in September, 1924.

§ 3. Production.

1. **Timber.**—Estimates of the quantity and value of local timber sawn and hewn in the sawmills of the various States are given hereunder :—

SAWMILL OUTPUT OF NATIVE TIMBER, 1920-21 TO 1924-25.

State.	1920-21.	1921-22.	1922-23.	1923-24.	1924-25.
	1,000 sup. feet.	1,000 sup. feet.	1,000 sup. feet.	1,000 sup. feet.	1,000 sup. feet.
New South Wales ..	156,112	143,593	147,108	167,493	162,423
Victoria	113,215	112,008	118,336	134,639	114,705
Queensland	(a)136,005	(a)112,987	(a)126,088	(a)141,672	(a)143,623
South Australia	5,598	3,398	1,187	1,350	3,981
Western Australia (a) ..	131,271	163,991	149,158	161,749	189,019
Tasmania	(a)59,047	(a)54,518	(a)45,564	63,120	50,799
Total	601,248	590,495	587,441	670,023	664,550

(a) Year ended 31st December.

In addition to the timber shown above for Western Australia, the following quantities were hewn by contractors for the Railway Department, Mines, etc., or were sawn in establishments other than forest sawmills during the past five years :—1920-21, 6,662,144 sup. feet; 1921-22, 19,672,258 sup. feet; 1922-23, 29,901,378 sup. feet; 1923-24, 30,797,419 sup. feet; and 1924-25, 18,118,199 sup. feet.

2. **Other Forest Products.**—(i) *Eucalyptus Oil.* Oil may be distilled from the foliage of all varieties of eucalyptus, and several of them furnish a product widely known for its commercial and medicinal uses. Complete information regarding Australian production and consumption of eucalyptus oil is not available, but large quantities are manufactured, particularly in Victoria. Oversea exports amounted in 1921-22 to £24,000, in 1922-23 to £33,990, in 1923-24 to £66,339, and in 1924-25 to £75,763, the bulk of the product being shipped from Victoria to the United Kingdom and the United States. Large quantities of the crude oil are used locally in flotation processes at the mines.

(ii) *Tan Barks.* The forests of Australia contain a wealth of tanning materials, all the eucalypts being capable of furnishing a percentage of tannin. The principal source of supply in Australia is obtained from the golden, and the black or green wattle, and in pre-war days the production was more than sufficient for local requirements and an export trade was built up. The supply is, however, diminishing, and since 1920-21 Australia has imported on the average nearly 3,000 tons each year from Natal, where the plantations were originally started from Australian seed. In addition to the wattle bark, a valuable tan bark is obtained from the mallet (*E. occidentalis*) of Western Australia. This bark is not extensively used in Australian tanneries, but is exported to Europe and other countries, where it is used for producing a tannin extract. An investigation of the resources in tanning materials of Western Australia recently completed by the Institute of Science and Industry proved that barks of common trees such as karri, gimlet and ridge-gum, formerly regarded as waste materials, are rich in tannin and excellent tanning agents. Investigations are proceeding in the other States, and additional sources of supply will probably be revealed. In Western Australia, moreover, there are extensive areas of red-gum which exudes considerable quantities of a kino (gum) possessing a very high percentage of tannin. This material has not been very largely used, however, owing to the red colour it imparts to the leather, but this disadvantage has been overcome by the Institute of Science and Industry, which has applied for a patent covering the preparation of the tan solution from raw kino. The production of tan bark in Australia is estimated at about 28,000 tons per annum.

3. **Value of Production.**—Though the valuation of the quantity of firewood consumed in Australia presents serious difficulty, an estimate of the total value of forest production is annually compiled with the following results for the past five years :—

VALUE OF FOREST PRODUCTION.—AUSTRALIA, 1920-21 TO 1924-25.

Production.	1920-21.	1921-22.	1922-23.	1923-24.	1924-25.
	£	£	£	£	£
Total ..	8,877,000	8,998,000	9,344,000	10,292,000	10,577,000

§ 4. Commercial Uses of Principal Australian Timbers.

1. **General.**—The uses of the more important Australian timbers are many and various, and are indicated in previous issues of this work. (See Official Year Book No. 6, pp. 454–6; and Official Year Book No. 10, Section III., § 7 and 8.)

The Commonwealth Government utilizes Australian woods for rifle stocks, telephone switch boards, aeroplane parts, etc. Queensland maple (*Flindersia chatawaiana*) is largely used for rifle stocks, and coachwood is available for the same purpose. Australian timber is also seasoned and stored, depots having been established by the Commonwealth Government at Canberra and Newington in New South Wales, and at Maribyrnong in Victoria; by State Governments at the principal centres; and by private enterprise as required.

2. **Lack of Uniformity in Nomenclature.**—Unfortunately the vernacular names applied to the gums, ironbarks, etc., in the various States, and even in different parts of the same State, do not always refer to identical timbers. The resulting confusion has not only been productive of loss, but it has, to some extent, prejudicially affected the timber trade. This subject is referred to at some length in the special article "Australian Eucalyptus Timbers," in Section III., § 7 and 8, in Official Year Book No. 10. At the Forestry Conferences alluded to above, the matter came up for special consideration, and steps were taken to establish a uniform nomenclature.

§ 5. Oversea Trade.

1. **Imports.**—(i) *Dressed Timber.* The quantity and value of timber imports into Australia during the four years 1921–22 to 1924–25 inclusive are shown according to countries of origin in the following tables :—

DRESSED TIMBER.—IMPORTS, AUSTRALIA, 1921-22 TO 1924-25.

Country of Origin.	Quantity.				Value.			
	1921-22.	1922-23.	1923-24.	1924-25.	1921-22.	1922-23.	1923-24.	1924-25.
	sup. ft.	sup. ft.	sup. ft.	sup. ft.	£	£	£	£
United Kingdom ..	230	625	3,443	1,083	21	33	659	112
Canada	1,761,394	4,119,889	5,112,662	3,122,711	15,218	44,113	59,456	33,733
Other British Countries	4,182	2,995	17,998	109,050	55	124	568	1,363
Norway	13,794,952	49,971,566	38,071,271	41,824,922	242,092	724,507	528,346	605,784
Sweden	9,094,863	30,299,618	46,363,406	25,814,691	120,127	421,307	633,704	306,715
United States ..	2,508,918	7,196,660	8,040,984	15,789,591	34,189	63,998	94,492	173,095
Other Foreign Countries	67,307	497,096	48,032	39,147	1,998	6,468	1,168	2,004
Total ..	27,231,846	92,088,449	97,657,796	86,701,195	413,700	1,260,550	1,318,393	1,122,806

The figures in the table above are exclusive of items such as architraves, veneers, etc., quantities for which are either not shown, or are expressed in dissimilar units in the Customs entries. The total value of the items so excluded amounted to £122,601 in 1924–25, including plywood, veneered or otherwise, £96,557.

The bulk of the imports of dressed timber comes from Norway, Sweden, and the United States. Practically the whole of this timber consists of softwoods—deal and pine—used for lining, weatherboards, flooring, shelving, doors, box-making, etc.

(ii) *Undressed Timber.* Australian imports of undressed timber for the latest available four years are given hereunder :—

UNDRESSED TIMBER, INCLUDING LOGS (*b*).—IMPORTS, AUSTRALIA, 1921-22 TO 1924-25.

Country of Origin.	Quantity.				Value.			
	1921-22.	1922-23.	1923-24.	1924-25.	1921-22.	1922-23.	1923-24.	1924-25.
	sup. ft.	sup. ft.	sup. ft.	sup. ft.	£	£	£	£
United Kingdom	7,179	28.736	25,226	49,168	259	1,216	1,482	1,183
Canada ..	17,679,952	43,548,208	52,976,045	22,454,122	174,878	314,978	475,450	166,934
India	24,382	62,909	97,869	322,963	482	769	2,693	6,559
Malaya (British)	226,145	237,433	257,560	176,539	1,944	2,057	1,944	1,509
New Zealand ..	49,038,544	42,822,742	42,843,088	44,170,689	660,824	533,962	510,165	594,478
Other British Countries ..	1,854,686	1,699,662	971,622	890,033	13,852	14,471	9,803	9,112
Japan	3,943,538	6,116,548	5,082,326	8,103,367	86,686	130,550	113,196	200,187
Java	*a* 1,051,820	*a* 884,416	*a* 577,930	928,474	*a* 6,753	*a* 8,097	*a* 8,058	10.230
Norway ..	339,185	406,720	1,724,176	3,528,405	14,290	5,761	27,207	37,086
Sweden ..	816,902	3,220,682	6,914,823	5,864,057	10,669	44,012	96,407	61,583
United States ..	98,849,251	169,636,426	226 360,751	219,487,525	998,259	1,665,312	2,762,302	1,921,325
Other Foreign Countries ..	2,668,107	3,871,076	6,147,964	9,963,442	40,962	69,751	67,349	131,229
Total ..	176,499,691	272,535,558	343,979,380	315,938,784	2,009,858	2,790,936	4,076,056	3,141,415

(*a*) Including other Dutch East Indian possessions. (*b*) Exclusive of timber not measured in super. feet.

By far the larger proportion of the undressed timber imports consists of softwoods such as yellow pine, redwood, and oregon from the United States of America and Canada; kauri, rimu, and white pine from New Zealand; pine from Japan, and (prior to the war) red deals from Russia, Norway, and Sweden. Amongst the hardwoods imported, the principal are oak from the United States of America and Japan, and teak from India.

2. Exports.—The quantity and value of undressed timber exported from 1920-21 to 1924-25 are given below, the countries of destination being also shown :—

UNDRESSED TIMBER, INCLUDING LOGS (*a*).—EXPORTS, AUSTRALIA, 1920-21 TO 1924-25.

Country to which Exported.	Quantity.					Value.				
	1920-21	1921-22	1922-23	1923-24	1924-25	1920-21	1921-22	1922-23	1923-24	1924-25
	1,000 sup. ft.	1,000 sup. ft.	1,000 sup. ft.	1,000 sup. ft.	1,000 sup. ft.	£	£	£	£	£
United Kingdom ..	18,078	8,824	5,731	14,154	17,580	181,451	116,017	75,556	143,443	192,744
Canada	32	136	41	198	201	912	3,030	866	2,915	4,272
Ceylon	340	6,203	1,898	3,222	4,822	3,316	61,759	19,392	30,773	44,798
Egypt	6,890	402	(*b*)	(*b*)	(*b*)	55,800	4,696	(*b*)	(*b*)	(*b*)
Hong Kong ..	395	462	334	..	..	4,954	6,580	3,883	..	..
India	10,220	9,161	2,672	12,588	1,230	88,650	91,358	28,468	125,865	11,274
Malaya (British) ..	..	2	176	..	..	..	24	5,045	..	..
Mauritius	1,834	3,706	2,367	2,835	2,448	22,014	50,591	24,546	29,849	24,152
New Zealand ..	25,354	23,874	24,845	36,349	46,318	459,597	358,960	324,052	510,035	680,802
Pacific Islands—										
Fiji	1,011	845	664	1,130	781	17,238	12,604	10,307	17,407	13,286
Territory of New Guinea ..	158	95	157	213	239	4,254	2,401	2,883	4,572	4,483
Other Islands ..	896	586	474	535	715	20,684	12,597	8,339	10,558	16,520
Papua	189	99	217	316	405	10,990	2,391	3,814	5,347	7,197
South African Union	34,935	37,261	42,376	24,681	51,902	353,424	395,026	472,564	273,713	558,511
Belgium	2,597	1,766	595	716	2,182	24,897	18,790	5,949	7,157	21,819
China	3,420	1,939	3,149	3,695	4	39,682	19,796	27,418	36,951	197
Egypt	..	..	(*c*)1,981	5,341	66	..	..	(*c*)19,963	55,666	664
Japan	625	128	173	116	..	8,380	2,478	2,169	2,100	..
Pacific Islands—										
New Caledonia ..	55	51	32	57	76	1,600	1,234	538	1,034	1,450
Other Islands ..	140	62	63	87	124	3,648	1,426	1,329	1,658	2,079
U.S. of America ..	668	489	439	399	469	17,466	12,550	11,196	9,318	12,169
Other Foreign Countries	380	303	122	276	433	6,126	4,417	1,865	3,587	5,855
Total ..	108,217	96,394	88,500	106,908	130,004	1,325,083	1,178,725	1,050,142	1,271,948	1,602,272

(*a*) Exclusive of timber not measured in super feet. (*b*) Now recorded as a Foreign Country.
(*c*) Previously recorded as a British Country.

As the table shows, the bulk of the exports of undressed timber was consigned to South Africa, New Zealand, and the United Kingdom, and consisted largely of the Western Australian hardwoods, jarrah, and karri, which have earned an excellent reputation for such purposes as railway sleepers, harbour works, wood paving, etc.

3. **Classification of Imports and Exports.**—(i) *General.* The quantities of timber classified according to varieties imported and exported during the year 1924–25 are given in the next table :—

TIMBER, VARIETIES IMPORTED AND EXPORTED.—QUANTITIES, AUSTRALIA 1924–25.

Description.	Unit of Quantity.	Imports.	Exports.	Excess of Imports over Exports.
Dressed	sup. ft.	86,701,195	714,576	85,986,619
Undressed, including logs	,,	315,938,784	130,003,571	185,935,213
Architraves, mouldings, etc.	lin. ft.	7,300	233,562	— 226,262
Plywood, veneered or otherwise	sup. ft.	5,294,469	(*b*)	(*b*)
Palings	No.	..	550,551	— 550,551
Pickets	,,	37,938	350	37,588
Shingles	,,	1,145,600	192	1,145,408
Staves—				
Dressed, etc.	,,	242,584	5,756	236,828
Undressed	,,	1,755,937	13,481	1,742,456
Laths—				
For blinds	,,	(*a*)	(*a*)	(*a*)
Other	,,	22,009,103	..	22,009,103
Doors	,,	27,080	(*a*)	(*a*)
Wood pulp	ton	12,257	(*b*)	(*b*) 12,257
Veneers	—	(*a*)	(*b*)	(*b*)
Spokes, rims, felloes, etc.	—	(*a*)	(*a*)	(*a*)
Other	—	(*a*)	(*a*)	(*a*)

(*a*) Quantity not available. (*b*) Exports not recorded separately.

NOTE.—The minus sign — denotes an excess of exports.

Similar particulars relative to the values of imports and exports during the year 1924–25 are shown hereunder :—

TIMBER, VARIETIES IMPORTED AND EXPORTED.—VALUES, AUSTRALIA, 1924–25.

Description.	Imports.	Exports.	Excess of Imports over Exports.
	£	£	£
Dressed	1,122,806	17,836	1,104,970
Undressed, including logs	3,141,415	1,602,272	1,539,143
Architraves, mouldings, etc.	81	1,650	— 1,569
Plywood, veneered or otherwise	96,557	(*a*)	(*a*) 96,557
Palings	..	7,270	— 7,270
Pickets	307	6	301
Shingles	2,386	4	2,382
Staves—			
Dressed, etc.	3,418	442	2,976
Undressed	24,949	266	24,683
Laths—			
For blinds	10	141	— 131
Other	33,584	..	33,584
Doors	21,756	1,362	20,394
Wood pulp	180,383	(*a*)	(*a*) 180,383
Veneers	16,083	(*a*)	(*a*) 16,083
Spokes, rims, felloes, etc.	6,089	4,492	1,597
Other	2,449	..	2,449
Total	4,652,273	1,635,741	3,016,532

NOTE.—The minus sign — denotes an excess of exports. (*a*) Exports not recorded separately.

(ii) *Sandalwood.* A considerable amount of sandalwood is annually exported principally from Western Australia to China, where it is highly prized, and largely used for artistic and ceremonial purposes. Particulars for the past five years are as follows :—

SANDALWOOD.—EXPORTS, AUSTRALIA, 1920-21 TO 1924-25.

Country to which Exported.	Quantity.					Value.				
	1920-21.	1921-22.	1922-23.	1923-24.	1924-25.	1920-21.	1921-22.	1922-23.	1923-24.	1924-25.
	ton.	ton.	ton.	ton.	ton.	£	£	£	£	£
United Kingdom	1	4	..	..	..	110	267	2	..	..
Hong Kong	6,495	3,334	4,657	8,894	3,811	111,730	57,714	66,460	222,300	113,551
India	424	333	469	239	406	7,736	6,144	8,131	6,192	11,574
Malaya (British)	1,793	228	352	1,404	725	35,191	3,935	5,322	45,118	27,321
Other British Countries	..	2	2	..	..	..	36	30	..	..
China	2,419	575	2,419	3,754	1,722	39,798	7,611	30,876	83,415	53,031
Other Foreign Countries	7	6	..	..	..	136	123	3	..	..
Total	11,139	4,482	7,899	14,291	6,664	194,701	75,830	110,824	357,025	205,477

(iii) *Tan Bark.* Tan bark figures both as an export and import in the Australian trade returns, as the following tables show. The first table refers to exports :—

TAN BARK.—EXPORTS, AUSTRALIA, 1920-21 TO 1924-25.

Country to which Exported.	Quantity.					Value.				
	1920-21.	1921-22.	1922-23.	1923-24.	1924-25.	1920-21.	1921-22.	1922-23.	1923-24.	1924-25.
	cwt.	cwt.	cwt.	cwt.	cwt.	£	£	£	£	£
United Kingdom	360	1	12	..	48	202	1	3	..	48
New Zealand	56,360	17,047	12,718	5,278	4,061	39,356	11,927	8,299	3,263	2,372
Other British Possessions	100	..	309	..	332	88	..	194	..	170
Germany	..	..	..	9,005	36,081	..	..	..	4,983	19,587
Other Foreign Countries	8,400	822	4,490	3,318	2,272	7,084	534	2,220	2,172	1,155
Total	65,220	17,870	17,529	17,601	42,794	46,730	12,462	10,716	10,418	23,332

The exports of tan bark from Australia during the past two years consisted largely of mallet bark from Western Australia. The shipments of this bark are not so large as in pre-war days, owing to the cutting out of supplies. This bark is dispatched to Germany, where it is converted into a tannin extract.

A comparison of the imports and exports of tan bark during the last five years is given in the next table :—

TAN BARK.—IMPORTS AND EXPORTS, AUSTRALIA, 1920-21 TO 1924-25.

Particulars.	1920-21.	1921-22.	1922-23.	1923-24.	1924-25.
	cwt.	cwt.	cwt.	cwt.	cwt.
QUANTITIES—					
Imports	48,100	34,328	93,769	73,941	28,628
Exports	65,220	17,870	17,529	17,601	42,794
Excess of exports over imports	17,120	— 16,458	— 76,240	— 56,340	14,166
VALUES—	£	£	£	£	£
Imports	20,002	15,954	37,349	28,672	11,821
Exports	46,730	12,462	10,716	10,418	23,332
Excess of exports over imports	26,728	— 3,492	— 26,633	— 18,254	11,511

NOTE.—The minus sign — denotes excess of imports.

The imports consist almost exclusively of wattle bark from the plantations in South Africa. One variety of Australian wattle is found to flourish in the sandy belts near the coast, but it is the *Acacia decurrens*, var. *mollis*, which is chiefly relied upon for the production of wattle bark in the South African plantations. Seed has been tried from New South Wales, Tasmania, and Victoria, but it is stated that most of the seed is obtained from the best wattle bark areas in eastern Tasmania and western Victoria.

Two reasons are given to account for the success of the industry in South Africa. (*a*) It is found that the treeless, grassy highlands of Natal are specially suitable for wattle culture, and the trees can therefore be grown in rows and economically attended to, while the necessary bark sheds and other appurtenances can be placed in the most advantageous positions. (*b*) There is an abundance of cheap and efficient Hindu labour available for employment on the plantations.

Considerable quantities of tanning substances other than bark are annually imported into the Commonwealth. The total value of the importations in 1924–25 was £73,151, and was composed as follows:—Wattle bark extract, £1,310; quebracho extract, £19,344; other extract, £21,202; and valonia, myrobalans, cutch, etc., £31,295.

FORESTRY IN AUSTRALIA.*

§ 1. General.

1. **Evolution of Scientific Forestry.**—(i) *In Other Lands.* (*a*) *General.* It was by slow degrees only that the countries of the old world developed their forestry systems. Originally tribal common lands for feeding pigs, and hunting country open to all, the forests gradually became preserves of royal houses or of the aristocracy, the people generally being granted merely the right of pasturage. Step by step, as the value of the forests became better known, their use for the production of timber was emphasized, and usages, servitudes, and rights of entry which were opposed to the forestry interests were extinguished. Forestry is the scientific management of forests with a view to the highest sustained yield of timber and various other products. The principle of sustained yield is well established in Europe, and the forest is there regarded as capital, which, if properly managed, will yield its timber interest yearly and in perpetuity. Before this stage was reached, however, much timber was destroyed for the purpose of increasing grazing areas, and when the denudation took place on steep mountain sides, it was generally followed by serious erosion, and by the conversion of perennial streams into intermittent watercourses subject to torrential flows. At the higher levels, destructive avalanches followed the removal of the forest covering. These disasters taught the lesson of the protective value of the forest, and the destruction of timber on high mountains and at the sources of rivers is now prohibited.

(*b*) *France.* A large proportion of the State forests in France now consists of "protection" forests, which, if they yield little return in timber, are of great value to the communities on the plain. The annual expenditure on the reforestation of mountains is the heaviest item in the French forestry budget. Although after the revolution France sold half the 12,000,000 acres of State-owned forests, control even over privately-owned forests is now so strict that the owners are prohibited from clearing. City and country corporations hold 32 per cent. of the total forest area, and the working plans for the management of the forests under their control must be approved by the State Forestry Department. The silting over, due to erosion caused by timber destruction of land in the Pyrenees, Vosges, and Alpine regions, rendered land resumption and reforestation necessary on the low lands as well as on the mountains. The work has been carried out either by the State or by the Communes under the stringent *reboisement* law. The fixing of the shifting sand dunes to the south of the city of Bordeaux was undertaken at the beginning of last century, and, with the co-operation of the Communes no less than a quarter of a million acres of sterile land have been rendered productive. In the last 30 years, plantations have increased the forest area of France by 1,181,000 acres.

* Contributed by C. E. Lane Poole, Esq. (Diplomé, Nancy), Commonwealth Forestry Adviser, Department of Home and Territories.

(c) *Germany.* In Germany, a similar evolution to sound forestry practice has taken place, first, from the tribal forest to the hunting forest in which the tribes were allowed rights of pannage. These rights, with additional grants to religious bodies, persisted, and became serious servitudes which cost a considerable amount of money to extinguish during the last century. The dissipating of the forests synchronized with the growth of agricultural holdings. When the ownership of all forest land was inquired into at the end of the 18th century, it was found that State ownership was small in comparison with the areas held by the aristocracy, by the Communes, and by private people. A policy of repurchase was then embarked upon, and the position was greatly improved, so that before the great war it stood as follows:—The State (including about 3 per cent. Crown forests) owned 33 per cent. of the forests, private owners held 48 per cent., and corporations, etc., owned 19 per cent. The policy in regard to details of management of the Communal forests, differs in each of the States. In some, the direction is by the State Government; in others, the State contributes to the cost of forestry. Throughout Germany, however, not only are the forests of the State and the Communes under scientific management, but no less than 30 per cent. of the private forests are subject to Government supervision. In certain States, moreover, the appointment is enforced of trained staffs to manage these private forests.

(d) *England.* England, in its neglect of forestry, differs from all other European countries. Its island situation, its command of the sea, the close proximity of large supplies of timber, and finally its large industrial population combined to induce an attitude of *laissez-faire* in forestry matters, in spite of the possession of a large area of waste land unsuitable for any purpose but forestry. It was found during the war that all available shipping was required to carry food and munitions, and the dearth of timber supplies was soon acutely felt. After the termination of the war, land was repurchased for forestry purposes, with the object of planting a sufficient area to assure a supply of home-grown timber for three years in the event of another war.

(e) *India and Burma.* In India, mainly under the influence of German scientific forest thought, a forest wealth has been built up which in 1923–24 yielded £1,300,000. The Indian forestry service was founded in 1862, and the area under forestry control is now 146,464,000 acres. In Burma the great forests of teak are so managed by qualified European foresters that they continue to yield regular quantities of this valuable timber annually to the whole world.

2. **Requisite Proportion of Forest Area.**—It is generally held that when the proportion of forest in any country falls below 0.86 acres per head of the population, that country will be obliged to import timber. Australia possesses 4.25 acres of forest per head of population, and the excess of imports of timber over exports amounts to 28,000,000 cubic feet. There are two reasons for this excess. In the first place the area of 24,500,000 acres given as the wooded area comprises all forest lands, reproductive or otherwise. The bulk of this area consists of cut-over forests swept by fire at frequent intervals, and the area of really productive forests is not available. Secondly, Australia does not possess a surplus of softwoods, and must, therefore—with the exception of a small quantity produced in Queensland and northern New South Wales—import the bulk of its requirements from overseas. The figure 24,500,000 acres represents the total area that in the estimation of foresters should be reserved for forestry, and taking the factor of 0.86, then, when all the forest area of Australia has been brought under sylvicultural treatment, and is yielding its maximum of hard and soft woods, and none is being imported, the population of Australia would be 21 millions.

§ 2. Forestry Development in Australia.

1. **Progress in Each State.**—In Australia, forestry development has proceeded on very similar lines in each of the States, with the exception of South Australia. As was the case in South Africa, South Australia suffered from a deficiency in the area of indigenous forests, hence, for a generation, that State was forced to lead the way in afforestation policy. What happened in the other States was briefly as follows:—In the pioneering stage, there was wholesale destruction of forests to provide areas for agriculture. The

saw-millers who followed cut down some of the trees and converted them into merchantable timber. Then came the various State land-settlement programmes under which Government departments destroyed forests to make room for immigrants. Finally, a stage was reached when settlement was proved to be impossible on purely forest land, and the scientific forestry era began. South Australia has reached that stage. Western Australia for years has been rapidly exploiting its timber resources, and at the same time promoting land settlement on an extensive scale. Queensland has been exploiting its softwood resources at a rapid rate, and last year was forced to import softwood from overseas. Victoria and New South Wales are both in the stage when land settlement is beginning to take a less important place, and the governments are realizing that there is a considerable amount of land that will yield better returns under timber than under crops or grazing. Sound forestry methods will doubtless be adopted in those States. Tasmania has reached the final stage, and it is acknowledged there that much of the land on which settlement has been attempted is better adapted for forestry. Financial considerations at present will not, however, permit of embarkation on an intensive forestry policy.

While the successive steps just alluded to were being passed through, there was always a Forestry Service in each State. First it was a branch of the Lands Department, then as saw-milling grew in importance, and revenue expanded, and land settlement threatened the timber interests, the Forestry Branch was taken away from the Lands Department and constituted a separate department under another Minister.

The main business of these early departments was the collection of revenue, and policemen, Crown Lands bailiffs, and similar functionaries acted as field officers. They were, of course, not scientific foresters, but simply tax collectors. The administration of the departments was often entrusted to clerical heads, and the Government had not the advantage of technical advice on forestry matters. Forest policy was largely a matter of political expediency. The saw-miller himself was the arbiter in regard to the timber he should cut—a selection system with the exploiter as selector. When differences of opinion arose between the Lands and the Forestry Departments as to the throwing open of land for settlement, the advice of the Lands Department was generally accepted. The opinion of a qualified surveyor on a point of agriculture was naturally regarded as sounder than that of an ex-policeman on a matter of forestry. That each was equally unqualified to give an opinion was of little moment to a Government desirous always of throwing open any land for settlement. Before the final stage was reached, the exhaustion of the forest resources and the dearth of available agricultural land led to strenuous efforts on the part of the powerful Lands Departments to alienate purely forest country. As a rule, therefore, the last stage, viz., the initiation of sound forestry methods, was not arrived at until there was little first-class forest land left in the hands of the Crown, and the question of repurchase had to be considered. Not only did Australia fail to learn the lesson taught by Europe in regard to forest destruction, alienation, and repurchase, but the separate States failed to learn from each other, and serious blunders were made.

The Forest Departments are being strengthened as time goes on, but the dearth of trained foresters is a serious bar to progress. The unqualified heads, or the tax-collecting field officers, are naturally not in a position to initiate scientific methods of management for the State forests, and little progress can therefore be made. There is urgent necessity for the co-ordination of forest control and the provision of organized systems of sylvicultural instruction.

2. **Activities of the Commonwealth Government.**—Forestry was not included amongst the matters transferred by the States to the control of the Commonwealth, and federal supervision, therefore, is restricted to the forests in the Commonwealth Territories. These territories cover a large area, and, with the exception of the Northern Territory, are capable of sound forestry development. It is only during the last few years, however, that any attempt has been made to take stock of the forestry position. Reports have been issued in regard to Papua, New Guinea, the Federal Capital Territory, and Jervis Bay, and a general policy has been drawn up for the management of the forests of

these Territories. So far as co-operation with the States is concerned, there has been progress in a small way in connexion with the investigation of minor forest products. The Commonwealth Institute of Science and Industry, for example, has carried out valuable research work into the pulping qualities of Australian hardwoods and into the tanning qualities of barks and other material. It is proposed to enlarge the work of investigation into minor products, and, through a Forestry Bureau of the Commonwealth Government, to co-operate with the States in major forest work. An Australian Forestry School has been founded, and the Federal Capital Commission has appointed a qualified forester to manage the forests at Canberra and Jervis Bay, while it is anticipated that in both New Guinea and Papua the forests will shortly be placed under technical management.

3. Nature and Extent of Australian Forests.—The wooded area of Australia contains a large number of xerophilous trees and woody shrubs which thrive in regions receiving less than 10 inches of rain per annum. Country devoid of tree growth is rare, the conditions being due to lack of suitable soil rather than lack of rainfall. Sand dunes, rock exposures, and clay pans are the most common treeless areas. A treeless region such as the 300 miles long Nullarbor plain is quite exceptional. There the lack of tree growth is due to the failure of the limestone formation to retain moisture. While, however, the major portion of Australia carries trees, and may be said to be well wooded (the term "desert" applying to relatively small areas only), dense forest is confined to a very narrow fringe. The savannah forests of the interior yield minor products such as sandalwood and tanbarks, but do not produce timber. These open, park-like formations carry only scattered trees of low habit. The bulk of the commercial forest products comes from the thickly-timbered areas comprised in the 30-inch and over rainfall belt south of the Tropics, and the 70-inch and over rainfall belt in the Tropics. The total area is comparatively small, and is confined to the following districts :—(*a*) The coastal belt in the extreme south-west of Western Australia, from a little north of Perth to Albany ; (*b*) the Otway country, in the south of Victoria, and the whole of the south-eastern portion of that State ; (*c*) the mountain forests of Victoria and New South Wales. A forest fringe extends along the coast of New South Wales and Queensland, the rainfall rising from 30 inches in the south and temperate portion to 140 inches in the Tropics. The greater portion of Tasmania receives sufficient rainfall to carry high forest, but a very small area only in South Australia, and practically none in the Northern Territory, are endowed with the necessary rainfall. Edaphic forests occur here and there, and the most important belt is probably that which is to be found on each side of the Murray River in New South Wales and Victoria. Red Gum (*E. rostrata*) is the riverine species. Practically the whole of Papua and New Guinea carry or have carried dense forests, the exceptions being certain small dry belts where the rainfall is less than 70 inches. Norfolk Island was, at one time, covered with a thick jungle.

4. Forest Reserves.—At the Inter-State Conference in Hobart in 1920, the foresters of Australia agreed upon the areas in each State that it was possible to reserve permanently for forestry. The areas were distributed as follows :—

State.	Suggested Forest Reserves.
	Acres.
New South Wales	8,000,000
Victoria	5,500,000
Queensland	6,000,000
South Australia	500,000
Western Australia	3,000,000
Tasmania	1,500,000
Total ..	24,500,000

The reservations actually made amount to 10,984,460 acres, leaving roughly 14,000,000 acres to be dedicated.

A difficulty common to all States is that the commercial forest area falls within the arable belt, and there is a tendency on the part of those responsible for land settlement to regard all land as potentially agricultural, and to resist attempts made to reserve purely forest land. At the root of the trouble is the inability to realize that forestry is agriculture on a long rotation, and that much land wholly unfit for agriculture is suitable for forestry. Moreover, the wait for returns is so long that it fails to interest the average man and his Parliamentary representative. On the other hand, the enormous area of the Continent seems empty with its 6,000,000 people only, and the cry " We want men, not trees " appeals to the average elector. The destruction over large areas of forest growth to make room for settlement has driven the saw-miller into less commercially accessible forest, so that he now has difficulty in competing against the imported Douglas Fir (Oregon) from U.S.A. or deals from the Baltic. Much of the so-called agricultural area will possibly in years to come revert to the Crown through non-payment of taxes or through repurchase. In the meantime, the forester's work lies in the more remote areas, and on the higher mountains, where, on the one hand, there is less opposition to permanent reservation, and, on the other, the forest conditions are much more difficult, particularly as regards fire control. Even so, the agriculturally sterile Darling Range in Western Australia, which carries magnificent jarrah, still remains unreserved, and the Forestry Department is carrying out sylvicultural work in forests which are not permanently reserved, and are, therefore, subject to alienation.

5. **Forest Production.**—(i) *General.* While Forestry Departments have been in existence in New South Wales and in Victoria for over a generation, there are, however, no reliable data regarding the yield per acre of the indigenous forests. The increment of the forests is unknown, and forest management is in its infancy. The interests of the saw-miller have been paramount, and the selection system has been governed by his requirements. In the less wealthy States, where forestry practice has been introduced at a later date, the tenets of sound forestry have been better realized, and the necessity appreciated for a thorough training in the profession. Thus, Western Australia, in the south-west, and Queensland in the north-east, are now leading the way in working plans, and very soon satisfactory yield-tables may be expected for their indigenous forests. South Australia, which never boasted large areas of indigenous forests, has laid down what in comparison with the small efforts of the wealthier States is a large area of plantations. Yields per acre are known, and the way is now clear for an extension of coniferous planting, based on the experience of 46 years' continuous work. The value of forest production for the year 1924–1925 was estimated at £10,577,000. This figure represents the value of all timber sold in the round or converted, including an estimate of the value of the firewood used.

(ii) *Common Forest Species.* When the vast number of species of the genus *Eucalyptus* is counted, and to these is added the wealth of tropical and sub-tropical rain-forest species of Queensland and New South Wales, together with the few conifers, the number of common species is too great to allow of separate enumeration within the limits of the present article. All that can be done here is to select the best known from a trade standpoint, at the same time making the proviso that practically no intensive technological work has been carried out, and that many species now considered valueless may in the future find a good market.

In a young country, the value of a timber is generally estimated according to its durability in the ground. Fence posts, house props, and sleepers are wanted, and they must last. Hence, a fine all-round timber like jarrah (*E. marginata*) is relegated to the sleeper-market, and, in consequence, the waste at the saw-mills rises to 70 per cent. while the mill manager cuts his tally of sleepers to fill an overseas order. In another State, blackwood (*Acacia melanoxylon*) is used for fence posts, and red cedar (*Cedrela Toona*) elsewhere is used for outbuildings. A splendid constructional timber like karri (*E. diversicolor*) is condemned as useless because it will not stand in the ground for many years as a sleeper or a house prop, and 6d. a cube is spent to make it durable by a process called " powellizing."

The following is a list of the Australian timbers best known on the local markets:—

(*a*) SCLEROPHYLLOUS FOREST OF THE SOUTH, WEST, AND EAST—MAIN GENUS *Eucalyptus*.

E. *globulus*	Blue Gum
,, *obliqua*	Messmate or Stringy Bark
,, *regnans*	Mountain Ash or Swamp Gum
,, *gigantea* and *E. delegatensis*	Red Mountain Ash, Woollybutt, Gum topped Stringybark
,, *marginata*	Jarrah
,, *diversicolor*	Karri
,, *rostrata*	Murray River Red Gum
,, *capitellata*	Brown Stringybark
,, *sideroxylon*	Red Ironbark
,, *paniculata*	Grey Ironbark
,, *crebra*	Narrow-leafed Ironbark
,, *microcorys*	Tallow Wood
,, *maculata*	Spotted Gum.

CONIFERS.

Callitris & Frenela verrucosa	Cypress Pine
Dacrydium Franklinii (*a*)	Huon Pine
Arthrotaxis selaginoides (*a*)	King William Pine
Phyllocladus rhomboidalis (*a*)	Celery-top Pine.

OTHER.

Acacia melanoxylon	Blackwood
Fagus Cunninghamii	Myrtle
Atherospherma moschata	Sassafras
Banksia sp.	——
Casuarina sp.	Oaks

(*b*) TROPICAL AND SUB-TROPICAL RAIN-FORESTS.—BROAD-LEAVED TREES.

Cedrela Toona var. australis	Cedar
Flindersia Mazlini	Silkwood or Cedar
Flindersia australis	Crows Ash
Flindersia Ifflaiana	Hickory
Gmelina Leichardtii	White Beech
Castanospermum australis	Black Bean
Cryptocarya sp.	Walnut
Syncarpia laurifolia	Turpentine

(*c*) CONIFERS OF THE EAST AND NORTH-EAST.

Araucaria Cunninghamii	Hoop Pine
,, *Bidwilli*	Bunya Pine
Agathis Palmerstoni	Queensland Kauri Pine
Podocarpus elata	Brown Pine

(*a*) Confined to Tasmania.

(*d*) INTRODUCED SPECIES IN PLANTATION.

Excluding ornamental trees, the introduction of trees for forestry purposes is confined to conifers. South Australia took the first steps in this direction. The following species have been tried there and in other States :—

P. radiata (syn. insignis)	Monterey Pine
„ *pinaster (syn. maritima)*	Cluster Pine
„ *halepensis*	Jerusalem Pine
„ *canariensis*	Canary Pine
„ *ponderosa*	Yellow or Pondosa Pine
„ *nigra (syn. laricio)*	Black Corsican Pine
„ *palustris*	Longleaf Pine
„ *taeda*	Loblolly Pine
„ *muricata*	Bishop's Pine
„ *caribaea*	Slash Pine
Cedrus deodara	Cedar
„ *lebani and atlantica*	„
Pseudotsuga Douglasii	Douglas Fir or Or gon
Larix europea	Larch
Sequoia gigantea and S. sempervirens	Redwood

Specimens of other pines and of spruce and firs may be seen in botanic gardens and in a few arboreta.

(iii) *Area of Softwood Plantations.* The area of the softwood plantations in Australia is of particular interest, in view of the large imports of these timbers. Queensland has now begun to import softwoods owing to the insufficiency of the local coniferous supply.

AREA OF SOFTWOOD PLANTATIONS.—AUSTRALIA, 1924 1925.

State.	Area in Acres.
New South Wales	9,461
Victoria	8,550
Queensland	538
South Australia	13,774
Western Australia .. .	1,070
Tasmania	250
Total	33,643

The bulk of these plantations consists of Monterey Pine (*P. radiata*), the rapid growth of which makes it a general favourite among arboriculturists.

This comparatively small area evidences the lack of foresight in previous years. The imports of softwoods to Australia in 1924–25 amounted to approximately 30,000,000 cubic feet, valued at £3,400,000, and show the urgent need for developing a home supply.

(iv) *Sawn and Hewn Timber.* While some of the States keep records of the volume of timber in the round that is converted, others furnish data as to sawn and hewn timber only. Thus in 1924–1925 the volume of sawn and hewn timber produced in each State was as follows :—

State.	Cubic Feet to Sawn and Hewn Timber. 000 omitted.	
New South Wales	13,535	
Victoria	9,559	
Queensland	11,968	
South Australia	332	(includes pine converted from plantations)
Western Australia	15,752	
Tasmania	4,233	
Total	5,379	

(v) *Mining Timber, Telegraph Poles, etc.* Figures in regard to production are not complete for all States, but there is a heavy drain on the forests for this class of timber, and frequently trees which if left to mature would provide quantities of valuable milling timber are sacrificed to make mine props, telegraph poles, or piles for harbour works. Marking of timber for felling is gradually being introduced, and this practice will result finally in the thinnings only being used for the purposes mentioned.

(vi) *Firewood.* The figures in regard to production of wood fuel are unsatisfactory. Except in the larger cities, wood is the common domestic fuel throughout Australia, but, while some important industries, such as the gold-mining industry in Kalgoorlie furnish accurate data, in other areas the production figures are purely estimates.

In 1923–1924, New South Wales used 18,054,500 cubic feet of wood fuel, or approximately 8 cubic feet per head of population, which, allowing for the coal used, appears small. Victoria used 20,140,000 cubic feet in 1920, or about 13 cubic feet per capita. Figures are not available for South Australia, Tasmania, and Queensland. Western Australia gives an accurate return of the wood fuel used on the principal mining fields to raise steam, etc. This amounted in 1920 to 708,146 tons and in 1925 to 555,573 tons, or approximately 18,315,000 cubic feet. No estimate is, however, made in regard to the domestic consumption of wood fuel, while the figures quoted respecting mine consumption are incomplete owing to the absence of information from some areas.

(vii) *Sandalwood.* Australia exports annually a considerable quantity of sandalwood, principally to China, where it is mostly converted into joss sticks, although larger pieces are used to make various ornaments. Western Australia supplies the bulk of the exports. Thus in 1924–25, out of a total of 6,664 tons valued at £205,477, 6,243 tons were exported from Western Australia, and the remaining 421 tons were exported from Queensland. In Western Australia there are sandalwood oil distilleries, in which during 1923–24, 463 tons of wood were utilized, while £39,873 worth of oil was exported.

(viii) *Tan Barks.* The situation in Australia in regard to tan barks is peculiar, inasmuch as supplies of wattle bark are now drawn from South Africa. The wattle established there is *Acacia decurrens var. mollissima*, and is indigenous to Victoria, New South Wales, South Australia, and Tasmania. Seeds of this tree were tried some years ago in South Africa, and thrived so well that plantations were made in Natal, with the result that Australia now annually imports some 3,000 tons from this source. The estimated production of tan barks in Australia is 28,000 tons.

Figures showing imports, exports, and excess of imports of tan bark during each of the last three years are given hereunder :—

TAN BARK—TRADE IN, AUSTRALIA, 1922 TO 1925.

Year.	Imports.		Exports.		Excess of Imports.	
	cwt.	£	Cwt.	£	Cwt.	£
1921–22 ..	34,328	15,954	17,870	12,462	16,458	3,492
1922–23 ..	93,769	37,349	17,529	10,716	76,240	26,633
1923–24 ..	73,941	28,672	17,601	10,418	56,340	18,254
1924–25 ..	23,628	11,821	42,794	23,332	—14,166	—11,511

NOTE.—The minus sign — denotes excess of exports.

As the figures show, there is an export of bark in each year as well as an import. In pre-war days and during the past two years the export consists largely of mallet bark from Western Australia. This bark is not so "kind" as wattle bark, and is therefore not used extensively in Australian tanneries, but is exported to Europe and other countries, where it is used for producing a tannin extract.

The statistics of imports do not give tannin extracts separately, so that it is impossible to apportion the value which should be added to that of the bark imports to arrive at the total local requirements. It is not known, moreover, to what extent mallet bark enters into the manufacture of the extracts imported.

A survey of the tannin-producing materials of Australia is being conducted by the Institute of Science and Industry, and, already, several barks have been found valuable, among them—ridge gum (*E. alba*), which is indigenous in Northern Australia and Papua, promises to become a commercial product.

(ix) *Eucalyptus Oil.* The distillation of eucalyptus oil is mainly carried on in Victoria and Tasmania. The oversea exports thereof during the last three years were valued as follows :—

EUCALYPTUS OIL EXPORTS—AUSTRALIA, 1922 TO 1925.

Year.	Value
1921–22	£24,000
1922–23	£33,900
1923–24	£66,339
1924–25	£75,763

It may be noted also that large quantities of the crude oil are used locally in flotation processes on the mines.

(x) *Gums, Kinos, and Resins.* A variety of gums, kinos, and resins is obtainable in Australian forests, but with the exception of grass-tree gum, which is exported from South Australia and other States, there is very little trade in these minor products. The gum of several species of wattle is used as a substitute for gum arabic. The kino that exudes from Marri (*E. callophylla*) found in Western Australia, carries a heavy percentage of tannin, but, owing to the difficulty of decolourizing it, it is not used commercially to any great extent.

§ 3. Oversea Trade in Forestry Products.

An examination of the oversea trade returns shows that Australian imports of dressed timber come chiefly from Norway and Sweden. The main supplies of undressed timber are of American origin, the United States contributing more than 18 million cubic feet in 1924–25 and Canada 2 million cubic feet. New Zealand contributed 3¾ million cubic feet, while Japan and Sweden are together responsible for a million feet. Then come Norway, Java, Malaya, India, and lastly, the United Kingdom, which sent 2,500 cubic feet, probably re-exports of cabinet woods. This large importation of timber, amounting to 26½ million cubic feet, valued at £3,000,000, consists mainly of soft woods. A certain quantity of cabinet woods reaches Australia, and Japan sends oak as well as pine; but 97 per cent. of the importation is derived from coniferous timber. New Zealand sends white pine for butter boxes, etc., and kauri. Canada and America send Douglas fir, redwood, yellow pine, etc., and red and white deals reach Australia from Norway and Sweden.

Australian exports of undressed timber amounted in 1924–25 to 11,000,000 cubic feet, mainly exported from Western Australia, the other States participating to the extent of 3½ million cubic feet only. Without Western Australia's timber, the balance of imports would be extremely heavy. As it is, it amounted to over £3,000,000 in 1924–25. The Western Australian exports consist mainly of sleepers and railway scantling. Jarrah (*E. marginata*) is the principal timber exported, although karri (*E. diversicolor*) figures largely in the returns. The last-mentioned timber requires treating to render it durable, and is subjected to the process known as "powellizing." In three items only—architraves, palings, and laths—is there a balance of exports over imports, but the value is only £8,970.

Australian imports of paper and stationery in 1924–25 amounted to £6,845,778. The investigations by the Institute of Science and Industry into the pulping qualities of Australian hardwoods have shown that paper can be made therefrom on a commercial scale, and it is anticipated that private enterprise will embark on this industry. Not only would the paper-pulping industry help to adjust the balance of trade, but it would prove of great assistance to the forester, who at present finds it very difficult to dispose of thinnings.

§ 4. Activities of Forestry Departments.

1. **General.**—Apart from the collection of revenue from rents, royalties, etc., sylvicultural operations having for their object the improvement of existing stands of timber and the regeneration of cut-over areas have been undertaken in all States. At first, through lack of knowledge of forestry, these operations were carried out on expensive and unsatisfactory lines, and tended to retard rather than to hasten forest growth. A large amount of money was spent on the cleaning up of the forest floor, the field officers trying, as it were, to convert the forests into park lands. This destruction of shade-supplying soil-cover had a very harmful effect on the forests. Moreover, large sums were spent in Victoria and in New South Wales on thinning the forests in such a manner as to get a minimum of good timber in a maximum of time. The stems, rather than the crowns, were taken as the guide to the operation, and useful trees were removed at a high cost per acre, while no attempt was made to help the others in their fight for existence. These cleaned-up forests looked well, and photographs before and after thinning and floor cleaning impressed the uninitiated. With the advent of technically-trained foresters, sounder methods were instituted, and the field officers began to learn what scientific forestry means. The need of qualified men is, however, still pressing; progress is slow, and in places the old methods of so-called sylviculture are still in operation.

2. **Officers Employed.**—Some idea of the difficulties in effective administration confronting the Forestry Departments may be gathered from the following statement in regard to the number of fully qualified forestry officers in each State, and in the Commonwealth Forestry Department:—New South Wales, nil; Victoria, 2; Queensland, 1; South Australia, 3; Western Australia, 8; Tasmania, nil; Commonwealth, 3; total, 17

The establishment of efficient working plans is gradually taking shape, and systematic marking of trees for the mill or the hewer has been initiated. It is now recognized that it should not be left to the timber exploiter to decide what timber is to be cut, and what is to be reserved for future generations. Group selection methods of regeneration and sound forestry practice have been introduced in Western Australia, which State, as mentioned above, has the advantage of the largest number of technically-trained officers in the field.

The total number of employees in the various State Forestry Departments is as follows:—New South Wales, 442; Victoria, 166; Queensland, 262; South Australia, 164; Western Australia, 253; and Tasmania, 10.

3. **Inquiries by Tariff Board.**—During the course of the Tariff Board's inquiry into the subject of reforestation, officials of the States Forest Departments advocated the granting by the Federal Government of a subsidy to the States in the form of annual payments. In addition, an application was made on behalf of a proposed South Australian company, which, it was stated, intended to carry out afforestation on an extensive scale, for concessions in regard to Federal Land Tax on all areas planted, and a bounty on an acreage basis.

The destruction of indigenous forests, coupled with the failure to take adequate measures for reforestation, have at various times aroused emphatic protests. During the Board's investigations in connexion with timber duties, this subject was regarded as of national importance, and the opinion was expressed that both the Federal and State Governments should take steps to prevent the possible extinction of a great source of national wealth. Moreover, when the Inter-State Commission was dealing with the timber industry, in 1914–15, the subject of reforestation was brought forward, and was referred to as demanding immediate attention.

The Tariff Board advocated a conference between the Federal and State Governments, with a view to arriving at a common policy of afforestation either by co-operation between the Commonwealth and the States, or by the assumption by the Commonwealth—with the concurrence of the States—of responsibility for the protection and rehabilitation of the timber resources of Australia.

4. **Forestry Education.**—The urgent need for trained foresters has already been stressed. At each Inter-State Forestry Conference since 1917 the desirability was urged of establishing one first-rate school for the whole Commonwealth. All the State Departments were in agreement on the matter, but Governments did not take the necessary steps, and, although a site was chosen and the contribution from each State was fixed, the National School was not founded. The Commonwealth Government, therefore, has assumed the responsibility of establishing the institution and paying the teaching staff, while the States have agreed to nominate a certain number of students annually. Applicants for entry to the Australian Forestry School must have completed a two years' science course at one of the universities. It is anticipated that the institution will supply the States with foresters qualified to undertake all necessary forestry work, and that it will constitute a nucleus of forest knowledge designed to develop on sound lines the sylviculture of Australia. The School is housed for the first year at the Adelaide University, but in March, 1927, it will be transferred to Canberra, the Federal capital city. The first students enrolled numbered eighteen. New South Wales, Victoria, and Western Australia all possess forestry schools which have served a useful purpose in supplying training to the field staffs. The standard, however, was not sufficiently high to turn out fully-qualified forestry officers, while it was perhaps a little too high for the ordinary officer. With the establishment of the Australian Forestry School, the usefulness of these schools will be increased, and their functions and standards can be more definitely fixed.

§ 5. Forestry Legislation.

The laws governing the exploitation of Australian timber resources have been determined by the needs of the community. Originally the matter resolved itself into the securing of a revenue to the States from persons authorized to remove timber from Crown lands. A licence system was inaugurated under which persons engaged in the business paid fees and obtained permits covering a certain period. As time went on, and the demand for timber increased, saw-mills were established in greater number, and permits were issued covering long periods. In some cases, concessions were granted over very long terms. The apparent object of the legislation was to assist the saw-miller to exploit as much as possible as quickly as possible. This state of affairs persisted until the vested interests created began to diminish in power and influence, and readily exploitable timber became so scarce as to make saw-milling on a large scale a hazardous undertaking. The small saw-miller then came to the fore again, and competition enabled the State to derive greater revenue from fees and charges. The rapid exhaustion of the timber supplies, and the outcry raised against land settlement in forest country, finally caused the legislatures to pass long overdue Forestry Acts, with the object of conserving and regenerating their forest resources. It is to be feared, however, that in consequence of the lack of expert advice, much of the legislation failed to achieve its purpose.

The Acts provided for various methods of control and administration, but it is to Western Australia that the credit is due of introducing the important principle of the inviolability of a forestry working plan. A scientific working plan connotes a detailed scheme under which the forest area is to be worked for a period of years, and, to be effective, its continuity must be safeguarded by legislation. This safeguard was provided in the Western Australian Act, and has since been introduced in the Forestry Acts of Victoria and Tasmania. Next in importance is the provision of funds to enable the forest work to be carried on continuously. There is a natural aversion from the making of a present sacrifice for the benefit of future generations, and it is therefore necessary to provide the requisite funds by special legislation. Thus, in New South Wales and Tasmania there is provision for placing half the timber revenue in a special fund to be expended on forestry purposes only. Victoria also provides for a special forestry fund. Western Australia provides that three-fifths of the net timber revenue is to be expended on forestry. Queensland and South Australia, however, rely on annual appropriations in the estimates. In some States the policy has been initiated of bringing about the permanent dedication of land to forest purposes by giving the Government power under a Forestry Act to dedicate a prescribed area within a certain period. This has in some instances had the unfortunate result that useless land from a forestry standpoint has been hurriedly dedicated to conform with the provisions of the Act.

Provision is also made to protect dedicated forest land, thereby making its alienation difficult. As a rule, an amending Act or a motion by both Houses of Parliament is required to revoke the dedication of a forest reserve.

Regulations under the Queensland Act provide for the sale of forest produce by auction or tender. A similar proviso was introduced into the Western Australian regulations, and later on was adopted by New South Wales. A fair price is thereby ensured to the State for its timber and other forest products. The licence system is admissible only in the case of scattered products, such as tan barks or gums, where the expense of supervision of exploitation would be prohibitive. Wherever close supervision is possible, it is more advantageous to sell the forest products at the best price obtainable, and this is most satisfactorily ascertainable by the tender or the auction system.

§ 6. Fire Control.

Fire control constitutes a very serious problem, and clauses have been inserted from time to time in proposed Forestry Bills to prohibit the setting fire to forests and to provide for assistance to extinguish fires when discovered. Parliaments invariably have refused assent to such clauses. In Western Australia, however, good results have been arrived at by introducing stringent measures of protection under the Bush Fires Act. In declared areas in this State fires cannot be lit unless a permit has been obtained. Effective fire control, however, depends on skilled attention to the forest rather than on legislation. Where the forests are scientifically managed, with foresters resident therein, and skilled employees engaged in sylvicultural work, the danger of fire is reduced to one of simple control. The dissipation of departmental resources over a wide area, instead of being concentrated on the forests that are being scientifically worked, is largely responsible for the damage to forests by fire. Western Australia, owing to well-organized forest control, lost a negligible area of forest in 1926, but the loss sustained by both New South Wales and by Victoria was serious, and included large areas of coniferous plantations, as well as hardwood forests which had been sylviculturally treated at great expense.